MU-SPIN INTERNSHIP

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First Project

The Mass and Power Histories Project

➢**Designed a standard technical specifications document for mass and power of APL Missions.**

- **STEREO**
- **NEW HORIZONS**
- **MESSENGER**
- **CONTOUR**
- **NEAR**
- **TIMED**
- **ACE**
- **FUSE**
- **MSX**

Spacecraft Subsystems & Components

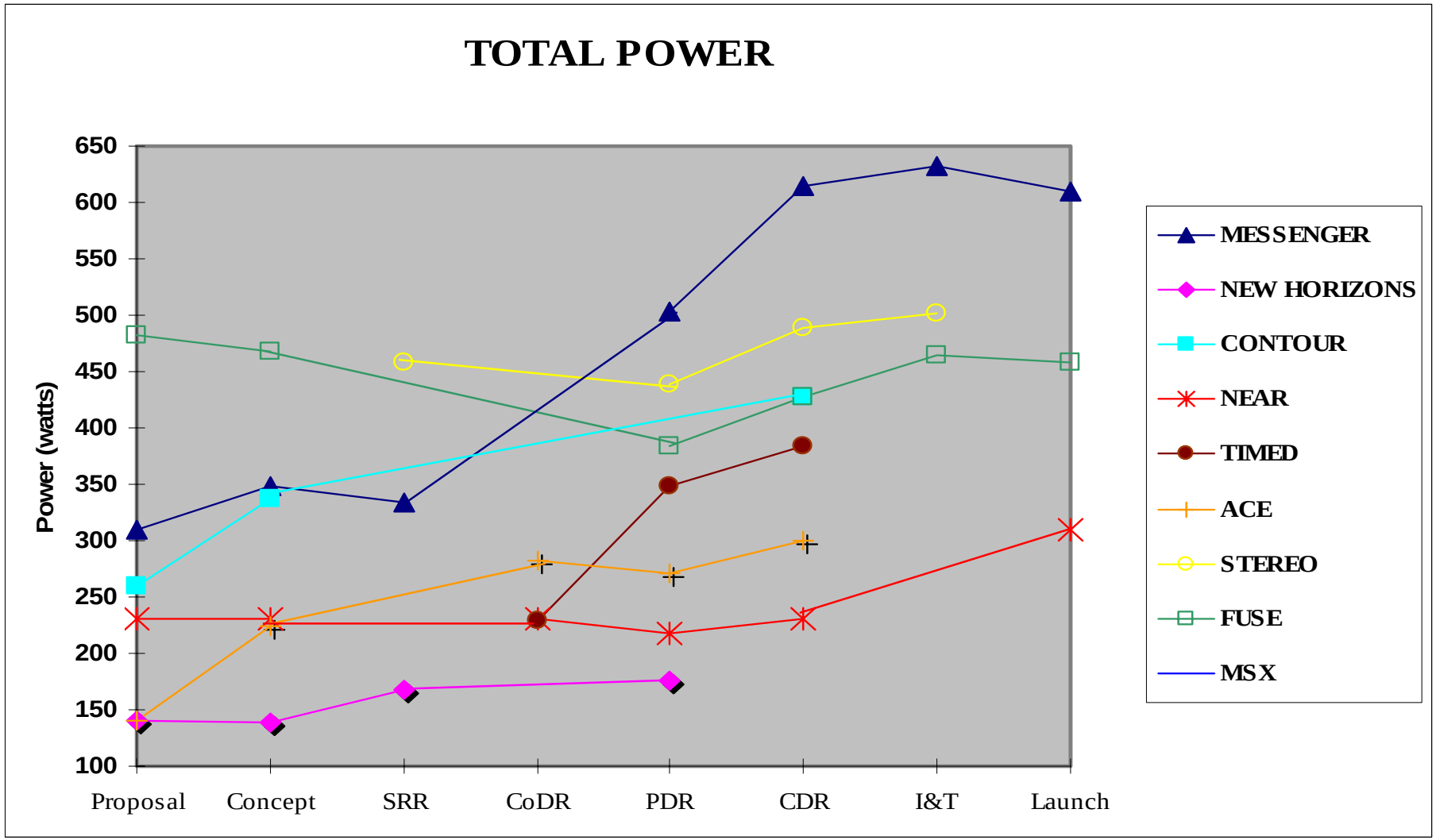
- Payload
- Avionics
- Power
- Radio Frequency (RF) Telecommunications
- Guidance & Control (G&C)
- Thermal
- Mechanical/Structural
- Propulsion
- Harness
- Propellent
- Margin

Conclusion

For Each Mission:

- **Total Dry Mass**
- **Wet Mass**
- **Lift Mass**
- **Total Power**
- **Available Power**

Graph

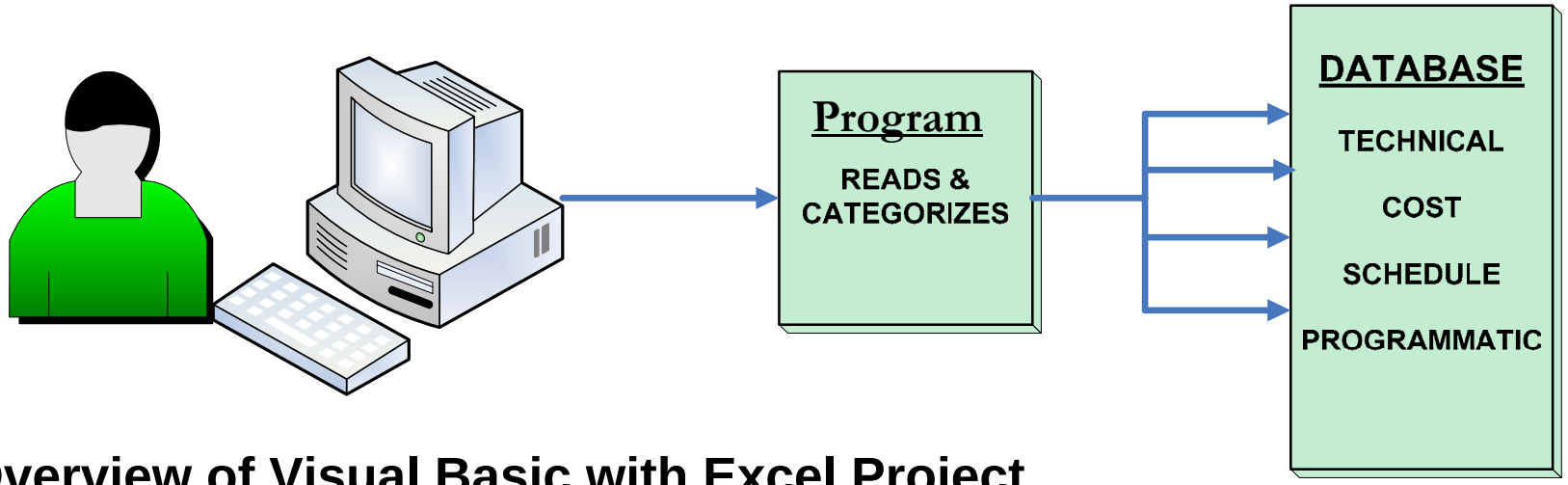

TOTAL POWER
Power (watts)
650
600
550
500
450
400
350
300
250
200
150
100
Proposal
Concept
SRR
CoDR
PDR
CDR
I&T
Launch
MESSENGER
NEW HORIZONS
CONTOUR
NEAR
TIMED
ACE
STEREO
FUSE
MSX

Overview of Project

- Provides Engineers a validation estimate of mass and power throughout the development of a mission.
- Mass and power also helps approximate the cost of a spacecraft.
- Take each mission as a past experience to develop future missions.

Second Project

Risk Management Database Project



Overview of Visual Basic with Excel Project

- The program organizes information in a large risk management database used for missions.

Third Project

Proposal Layout for a Systems Engineering Lab at APL

- Used Visio to conceptualize the arrangement of physical components necessary for this lab space.
- Details such as dimensions and budget are crucial for the beginning stage of a project.

Fourth Project

Environmental Verification Compliance Matrix Project

- Consulted with subsystem Lead Engineers of **STEREO.**
- Verified that each component of a subsystem met testing requirements.
- **Tests**:
  - **Mechanical Environment**
  - **Thermal Environment**
  - **Power Characteristics**
- Failures due to testing were discussed, and in some cases a waiver was issued.

STEREO SUBSYSTEMS

Within each subsystem there were 3-16 different components that required testing.

- **Power**
- **Guidance and Control**
- **Propulsion**
- **Telecommunications**
- **Avionics**
- **Mechanical/Structural**
- **Launch Vehicle**
- **Wiring Harness**

Overview of Project

- **Testing of a spacecraft is a crucial requirement for mission success.**

- **Important to document the testing status of each component of STEREO.**

Interesting Things That I've Learned

- Range of Mass and Power of multiple spacecrafts.
- Unique components of a spacecraft subsystem.
- Many different tests pertaining to each subsystem.
- Programming with Visual Basic, and Visio.
- Experience of working with successful Engineers.